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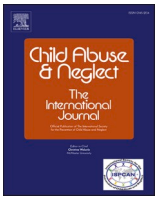

# Associations of childhood neglect, difficulties in emotion regulation, and psychological distresses to COVID-19 pandemic: An intergenerational analysis

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ABSTRACT

*Background:* Although individuals' psychological responses to trauma are varied, significant associations between parental and offspring's reactions have been documented among trauma-exposed families. Common susceptible factors originated from intergenerational transmission may be underlying mechanisms of this phenomenon.
*Objective:* This study aimed to investigate the intergenerational transmission of depression and anxiety during early outbreak of COVID-19 and further examined whether the transmission of child neglect and difficulties in emotion regulation (ER) was associated with the transmission of psychological distresses.
*Methods:* Self-reported questionnaires of depression, anxiety, COVID-19 related worries, difficulties in ER, physical and emotional neglect suffered in childhood were completed by 2011 Chinese parent - offspring dyads. Path analysis was used to examine hypothesized relationships.
*Results:* The proportions of physical neglect and emotional neglect were 31.2% and 16.9% respectively among parents, while 28.6% and 20.8% respectively among offspring. There were remarkably similar in response patterns between parents and offspring. Parents' COVID-19 related worries, depression and anxiety levels were significantly associated with offspring's COVID-19 related worries, depression and anxiety. Difficulties in ER not only impacted psychological distresses directly, but also mediated the relationships between childhood neglect and psychological distresses among both parents and offspring. Difficulties in ER and childhood neglect, as important risk factors, were modestly transmitted from parent to offspring.
*Conclusions:* Family members shared a certain degree of similarity in psychological reactions to trauma. Transmitted susceptible factors from parents to offspring may contribute to this similarity. Family therapy may be suitable for family members exposed to the same traumatic events.

## 1. Introduction

The outbreak of the coronavirus disease 2019 (COVID-19) is a global public health event, which has a profound influence on our lifestyles, physical and mental health (Wang et al., 2020). Numerous studies have documented increased psychological distress in both offspring and adults during the pandemic, including worries, depression, and anxiety (Loades et al., 2020; Rajkumar, 2020; Wu et al.,

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2021). During the pandemic, relatively high levels of depression (14.6% to 48.3%), anxiety (6.33% to 50.9%), stress (8.1% to 81.9%) and psychological stress (34.43% to 38%) were reported in the general population (Xiong et al., 2020). Besides, the results of a meta-analysis showed that the incidence of depression was 28%, and the incidence of anxiety was 25%, during the COVID-19 outbreak in China (Ren et al., 2020).

Although public health events or disasters make people very miserable, individual's psychological response is greatly different (Bonanno, 2004). The responses of individuals to trauma are related to the context in which traumatic events occur and depend on the combination of susceptible and resilience factors (Bonanno et al., 2010). In trauma-exposed families, parents and offspring show somewhat similarity in psychological reactions. Intergenerational transmission of common susceptible factors may be the underlying mechanism for this important relevant phenomenon, causing family members to face the same mental health problems. However, few studies have explored the transmission of possible susceptible factors during the COVID-19 pandemic using the family study design. Many studies have shown that childhood trauma and emotion regulation are important susceptible factors for post-trauma mental health (Copeland et al., 2007; Glaser et al., 2006; Hovens et al., 2012; Wright et al., 2009). Therefore, intergenerational transmission of childhood trauma and emotional regulation may explain the similarity of psychological reactions between parents and offspring in the context of COVID-19. Below, we will briefly review previous literature on transmission of psychological reactions to trauma, childhood trauma, and emotion regulation, then propose our hypothesized model to conceptualize parent and offspring's psychological reactions to the outbreak of COVID-19 in the same family system.

### *1.1. Associations between parents' and offspring's psychological reactions to trauma*

The intergenerational transmission of traumatic effects in families has been studied (Daud et al., 2005; Fossion et al., 2015), and there is a correlation between parents' and offspring's psychological reactions to trauma (Juth et al., 2015; Lambert et al., 2014; Lee, Pfefferbaum, et al., 2021; Lee, Ward, et al., 2021; Morris et al., 2012), meaning that mental health problems caused by traumatic events may be transmitted in families. The COVID-19 pandemic and prolonged quarantine are special traumatic events, and the transmission of mental health problems in families in the context of COVID-19 is worth studying. However, there is still a lack of research in this area (Zhang et al., 2022).

As mentioned above, the main mental health problems during the COVID-19 are depression and anxiety. The transmission of depression and anxiety from parents to offspring has been demonstrated by lots of previous studies in general population (Aktar et al., 2017; Biederman et al., 2001; Chang & Fu, 2020; Eley et al., 2015; Leis & Mendelson, 2010; Liu et al., 2021), with consistent evidence that depression and anxiety share a genetic liability (Kendler et al., 2008). However, the intergenerational transmission can also be attributed to environmental mechanisms (Eley et al., 2015; Lewis et al., 2011), such as negative parenting behavior (Goodman, 2020; Hammen et al., 2004), presenting non-verbal signals and communicating threatening information (Aktar et al., 2017), transmitting cognitive styles (Liu et al., 2021) and so on. In the current study, we focused on the transmitting childhood trauma and difficulties in emotion regulation.

### *1.2. Intergenerational transmission of emotion regulation*

The concept of emotion regulation is defined as “extrinsic and intrinsic processes responsible for monitoring, evaluating and modifying emotional reactions, especially their intensive and temporal features, to accomplish one's goals” (Thompson, 1994). A review (Morris et al., 2007) pointed out that family environment influenced offspring's emotional regulation development in three important ways: observational learning, parenting styles specifically related to emotion and emotion management, family emotional atmosphere formed by attachment relationship, family expressiveness and marital relationship. These three pathways are closely related to parents' emotional regulation. Previous studies provided substantial evidence that offspring's emotional regulation during periods of stress was largely dependent on their parents' emotional state (Bariola et al., 2011). During the pandemic, several studies confirmed that when parents showed more negative emotions, offspring were more likely to be affected (Dalton et al., 2020) and showed more negative emotions (Liang et al., 2021), and parents' emotional regulation skills made an important contribution to offspring's emotional regulation (Shorer & Leibovich, 2020).

During the COVID-19, people's mood and emotional facial recognition were affected (Melendez et al., 2020), and the use of negative emotional words on social media increased significantly (Su et al., 2021), making people prone to emotional regulation difficulties. Difficulties in emotion regulation often predicted more severe symptoms of depression and anxiety (Berking & Wupperman, 2012), which was also true during the outbreak (Moccia et al., 2021; Yang et al., 2020). Therefore, post-traumatic emotional regulation difficulties may lead to more severe psychological reactions to trauma.

### *1.3. Intergenerational transmission of childhood trauma*

Childhood trauma is a severe trauma that can have lifelong effects on a person's physical and mental health. A very important type of childhood trauma is child neglect. Child neglect, mainly including physical neglect and emotional neglect, is the neglect of meeting basic physical needs (such as clothing, food, shelter), education, health care and emotional support, resulting in actual or potential harm (Dubowitz & Bennett, 2007). The transmission of child neglect, especially from parents to offspring, has been supported by many theories and studies (Bartlett et al., 2017; Goodman et al., 2020) and one common possible explanation is Bandura's social learning theory. This theory holds that offspring learn how to behave by observing the behavior of others, and the behavior of the role model is internalized and replicated through repeated references to that behavior and operant conditioning. Parents who have experienced

childhood neglect do not understand the importance of providing the cognitive stimulation, emotion or other support needed for healthy development and may replicate this negligent parenting style in their offspring (Yang et al., 2018). Moreover, a prospective 30-year follow-up study revealed (Widom et al., 2015) that offspring of parents with a history of childhood neglect were more likely to report suffering from neglect.

During the quarantine, closed kindergartens and schools, social isolation, loss of external support, unemployment or working at home, economic pressures, all of which could make it difficult for parents to meet their offspring's basic needs, and thus had potential to exacerbate child neglect (Lee, Ward, et al., 2021). A study in the United States (Connell & Strambler, 2021) showed that more than half of caregivers (55.6%) had engaged in negligent parenting behavior in the past month, with physical neglect being the most common (33.9%). In another cross-sectional study, 26.7% of parents indicated emotional neglect for their offspring (Rodriguez et al., 2021). A series of previous findings suggested that neglected offspring had difficulties in identifying emotional expression (Young et al., 2011), low levels of emotion understanding, poor emotional regulation skills (Shipman et al., 2005), and difficulties in emotion regulation (Kim & Cicchetti, 2010). A study conducted during the COVID-19 also indicated that emotional neglect was positively related to emotional dysregulation (Janiri et al., 2021). Furthermore, both physical and emotional neglect are associated with a higher risk of depression and anxiety, which has been confirmed in many longitudinal studies and reviews (Cohen et al., 2017; Norman et al., 2012; Young et al., 2011).

### *1.4. Hypothetical model*

To sum up, there are substantial transmission of psychological reactions to traumatic events from parents to offspring, which may be related to transmission of susceptible factors such as, childhood trauma and emotional regulation. In individual level, studies have clarified possible mechanisms of childhood trauma, current trauma exposure, and emotional regulation that contributing to psychological reactions to trauma (e.g. the mediation of emotional regulation between childhood trauma and psychological distress; the moderation of emotional regulation and current trauma on psychological distress) (Choi & Oh, 2014; Hopfinger et al., 2016; Huh et al., 2017). Therefore, using COVID-19 pandemic as an example of trauma, we would examine whether the transmission of child neglect and difficulties in emotion regulation is associated with the transmission of psychological distresses in family system facing to the same trauma. According to the above summarized literature, our hypothesized model is presented in Fig. 1. Considering that the transmission effects of childhood trauma vary in types (Madigan et al., 2019) and adverse effects of different types of childhood trauma on depression and anxiety are also different (Humphreys et al., 2020), we subdivided child neglect into emotional neglect and physical neglect when testing the model.

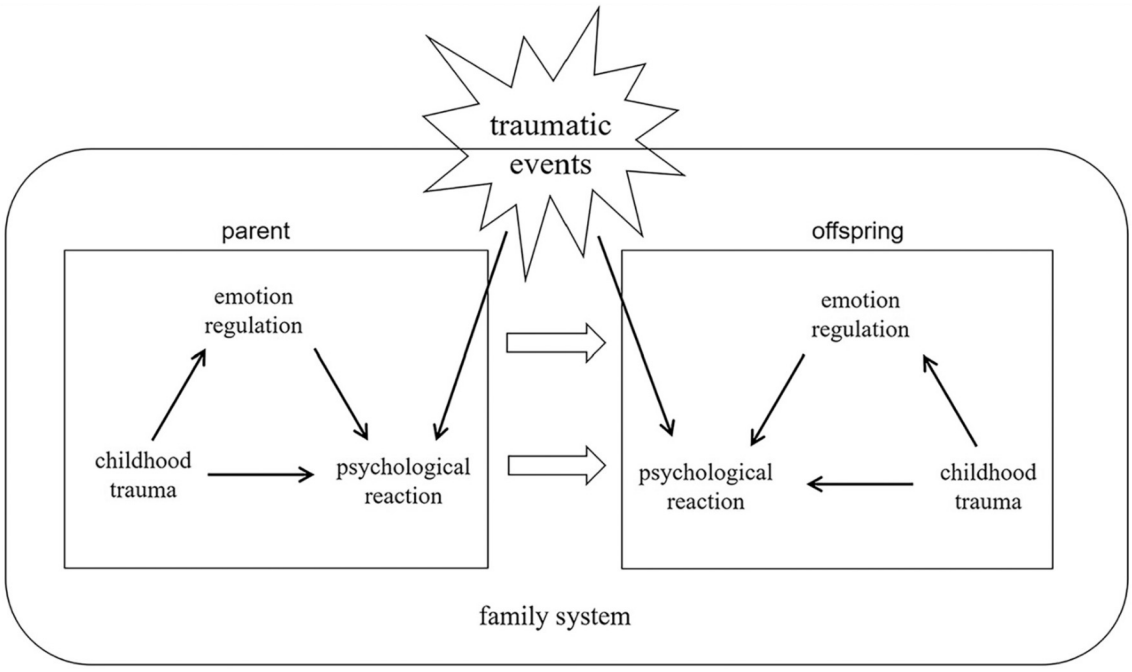


**Fig. 1.** Hypothetical model.

## 2. Methods

### 2.1. Participants

During the COVID-19 outbreak in February 2020, this study was conducted in Nanchang City, Jiangxi Province. Adjacent to Hubei Province, Jiangxi Province is at the middle economic level in China, and Nanchang is located about 260 km southeast of Wuhan. Students of Grade 4 and above from 2 schools in Lidu Town and one of their parents participated in this study. There were 3400 students in Lidu Middle School and 1011 students in grade 4 and above in Lidu Primary School. After matching with parents' data, 2011 pairs of data were used. Of the offspring aged from 9 to 20 years ($15.25 \pm 2.48$), 51.0% were boys and 49.0% were girls. Of the parents aged from 27 to 69 years ($41.10 \pm 5.34$), 40.8% were fathers and 59.2% were mothers. There were 49.3% urban residents and 50.7% rural residents. Only 27.3% of the parents had a high school or above education level, while the remaining 72.7% had primary or junior high school education.

### 2.2. Procedure

A self-reported structured online questionnaire was completed by offspring and parents at a given time. The survey began on February 13 and ended at 24 p.m. on February 19, 2020 for parents, while from February 18 to February 28, 2020 for offspring. Questionnaires were distributed through wechat mini program Questionnaire Star, and the head teacher sent the electronic link to the wechat group for parents and offspring to fill in. Parents and offspring were required to sign electronic informed consent, and the questionnaire must be completely filled out before submission. Parents helped their offspring fill out electronic questionnaires using mobile phones or computers. This study was approved by the Ethics Committee of School of Psychology, Jiangxi Normal University (Nanchang, China). Permissions and support from Jinxian County Education and Sports Bureau were obtained.

### 2.3. Measures

#### 2.3.1. Sociodemographic variables

Sociodemographic variables include gender, age, location and parents' education level.

#### 2.3.2. Depression symptoms

The Patient Health Questionnaire-9 (PHQ-9) was adopted to assess depression symptoms during the past two weeks (Kroenke et al., 2001). Items include “Little interest or pleasure in doing things” “Feeling down, depressed, or hopeless” and so on. There are 9 items in the PHQ-9 and each item is rated from 0 (not at all) to 3 (nearly every day). Higher total score indicates more severe depressive symptoms. A total score of 5 is recommended to screen depressive disorder. The Cronbach's α in offspring and parents were 0.899 and 0.832, respectively.

#### 2.3.3. Anxiety symptoms

The generalized anxiety disorder-7 (GAD-7) was adopted to measure anxiety symptoms in the last two weeks (Spitzer et al., 2006). Items include “Feeling nervous, anxious or on edge” “Feeling nervous, anxious or on edge” and so on. There are 7 items in the GAD-7 and each item is rated from 0 (not at all) to 3 (nearly every day). A total score of 5 is recommended to screen anxiety disorder. The Cronbach's α in offspring and parents were 0.912 and 0.895, respectively.

#### 2.3.4. Difficulties in emotion regulation

The 16-item version of the Difficulties in Emotion Regulation Scale (DERS-16) was used to measure emotion regulation difficulties (Bjureberg et al., 2016). Items include “When I am upset, I have difficulty getting work done.” “When I am upset, I become out of control.” and so on. Each item is applicable to a 5-point Likert scale from 1 (almost never) to 5 (almost always). The total scores range from 16 to 80, with a higher total score reflecting higher degree of emotional disorders. The Cronbach's α in offspring and parents were 0.957 and 0.942, respectively.

#### 2.3.5. Emotional neglect and physical neglect

The Childhood Trauma Questionnaire-Short Form (CTQ-SF) was used to screen maltreatment histories before the age of 18 (He et al., 2019). Emotional neglect (e.g., “felt loved,” “felt close to each other”) and physical neglect (e.g., “was taken to the doctor,” “wear dirty clothes”) are two subscales in the CTQ-SF. The two subscales both contain 5 items and each item is rated from 1 (never) to 5 (always). A total score of 15 is suggested to screen emotional neglect, and the cutoff value of physical neglect is 10. The Cronbach's α of emotional neglect in offspring and parents were 0.879 and 0.858, respectively, and the Cronbach's α of physical neglect were 0.438 and 0.455, separately.

#### 2.3.6. COVID-19 related worries

Three items were used to measure COVID-19 related worries: “Are you worried about yourself being infected with COVID-19?” “Are you worried about your family members being infected with COVID-19?” and “Are you worried about your neighbors being infected with COVID-19?” Each item was rated on a three-point scale: 1 = not worry; 2 = worry; 3 = very worry. The total scores were calculated by adding up the three items. The Cronbach's α in offspring and parents were 0.817 and 0.789, respectively.

#### 2.3.7. Self-quarantine

Parents were required to report their current identity category, and they had five choices: 1 = patients with confirmed; 2 = suspected patients; 3 = quarantine people in a hospital; 4 = self-quarantine people at home; 5 = common people. The first four options were combined as "self-quarantine" and were assigned a value of 1. The last option was identified as "not self-quarantine" and was assigned a value of 0.

#### 2.3.8. Quarantine of relatives and friends

Parents were required to report whether their family members, relatives, or friends were infected with COVID-19, and each item had five choices: 1 = someone was diagnosed; 2 = someone suspected of being infected was quarantined; 3 = not sure, and quarantined at home; 4 = no infection; 5 = unknown. The first three options were combined as "quarantine of relatives and friends" and were assigned a value of 1. The last two options were combined as "not quarantine of relatives and friends" and were assigned a value of 0. If there was an item with a value of 1, the sum was 1, and parents were considered to have relatives and friends in quarantine.

### 2.4. Analyses

First, demographic variables, COVID-19 related worries, emotional neglect and physical neglect and other study variables were calculated by descriptive statistical analysis. Second, Pearson correlation coefficient was used to calculate the correlation between variables. Additionally, according to the theoretical hypothesis, two path analysis models were established for further testing. One model included emotional neglect and other variables, and another model contained physical neglect and the same other variables. Goodness of model fit was verified according to the literature guidance (Hu & Bentler, 1999): Comparative Fit Index (CFI) $> 0.90$; Tucker-Lewis Index (TLI) $> 0.90$; Root Mean Square Error of Approximation (RMSEA) $< 0.08$; Standardized Root Mean Squared

**Table 1**
Sample characteristics.

| Variables | Parents (n = 2011) | Offspring (n = 2011) |
|---|---|---|
| | n (%) | n (%) |
| Gender | | |
| Male | 821 (40.8) | 1025 (51.0) |
| Female | 1190 (59.2) | 986 (49.0) |
| Location | | |
| Rural | 1020 (50.7) | |
| Urban | 991 (49.3) | |
| Education | | |
| Primary or junior high school | 1462 (72.7) | |
| High school or above | 549 (27.3) | |
| Self-quarantine | | |
| Yes | 239 (11.9) | |
| No | 1772 (88.1) | |
| Quarantine of relatives and friends | | |
| Yes | 177 (8.8) | |
| No | 1834 (91.2) | |
| Worrying about yourself infecting COVID-19 | | |
| Not worry | 487 (24.2) | 756 (37.6) |
| Worry | 1028 (51.1) | 919 (45.7) |
| Very worry | 496 (24.7) | 336 (16.7) |
| Worrying about family members infecting COVID-19 | | |
| Not worry | 361 (18.0) | 601 (29.9) |
| Worry | 1035 (51.5) | 1003 (49.9) |
| Very worry | 615 (30.6) | 407 (20.2) |
| Worrying about neighbors infecting COVID-19 | | |
| Not worry | 473 (23.5) | 832 (41.4) |
| Worry | 939 (46.7) | 845 (42.0) |
| Very worry | 599 (29.8) | 334 (16.6) |
| Physical neglect | | |
| Yes | 628 (31.2) | 575 (28.6) |
| No | 1383 (68.8) | 1436 (71.4) |
| Emotional neglect | | |
| Yes | 340 (16.9) | 419 (20.8) |
| No | 1671 (83.1) | 1592 (79.2) |

| | Mean (SD) | Mean (SD) |
|---|---|---|
| Age, years | 41.10 (5.34) | 15.25 (2.48) |
| Physical neglect | 8.31 (2.99) | 8.04 (3.12) |
| Emotional neglect | 10.05 (4.74) | 10.35 (5.44) |

**Table 2**
Means, SD, and correlations of studied variables.

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 Gender[a] (parents) | 1.00 | | | | | | | | | | | | | | | | | |
| 2 Age (parents) | −0.37*** | 1.00 | | | | | | | | | | | | | | | | |
| 3 Self-quarantine[b] (parents) | 0.01 | −0.03 | 1.00 | | | | | | | | | | | | | | | |
| 4 Quarantine of relatives and friends[c] (parents) | −0.03 | 0.04 | 0.21*** | 1.00 | | | | | | | | | | | | | | |
| 5 COVID-19 related worries (parents) | −0.01 | −0.07** | 0.07*** | 0.09*** | 1.00 | | | | | | | | | | | | | |
| 6 Difficulties in emotion regulation (parents) | 0.05* | −0.02 | 0.06* | 0.08*** | **0.15**** | 1.00 | | | | | | | | | | | | |
| 7 Physical neglect (parents) | −0.09*** | 0.08*** | 0.07** | 0.08*** | 0.01 | **0.16**** | 1.00 | | | | | | | | | | | |
| 8 Emotional neglect (parents) | −0.09*** | 0.06** | 0.09*** | 0.07** | −0.02 | **0.13**** | 0.59*** | 1.00 | | | | | | | | | | |
| 9 Depression (parents) | 0.04 | 0.04 | 0.08*** | 0.12*** | **0.12**** | **0.48**** | **0.23**** | **0.20**** | 1.00 | | | | | | | | | |
| 10 Anxiety (parents) | 0.06** | 0.01 | 0.09*** | 0.08*** | **0.20**** | **0.57**** | **0.13**** | **0.10**** | 0.67*** | 1.00 | | | | | | | | |
| 11 Gender[a] (offspring) | 0.06* | −0.03 | −0.03 | −0.01 | 0.04 | −0.01 | −0.06** | 0.02 | −0.01 | 0.00 | 1.00 | | | | | | | |
| 12 Age (offspring) | −0.14** | 0.42*** | 0.00 | 0.04 | −0.07** | 0.02 | 0.07** | 0.08*** | 0.08*** | 0.04 | 0.01 | 1.00 | | | | | | |
| 13 COVID-19 related worries (offspring) | 0.04 | −0.09*** | 0.04* | 0.06** | **0.48**** | 0.13*** | −0.00 | −0.03 | 0.06** | 0.13*** | 0.05* | −0.11*** | 1.00 | | | | | |
| 14 Difficulties in emotion regulation (offspring) | 0.00 | 0.03 | 0.02 | 0.06** | 0.07** | **0.28**** | 0.04 | 0.05* | 0.18*** | 0.21*** | 0.05* | 0.14*** | **0.11**** | 1.00 | | | | |
| 15 Physical neglect (offspring) | −0.05* | 0.02 | 0.07** | 0.09*** | 0.05* | 0.08*** | **0.38**** | 0.33*** | 0.13*** | 0.10*** | −0.04 | 0.07 | 0.01 | **0.13**** | 1.00 | | | |
| 16 Emotional neglect (offspring) | −0.01 | 0.00 | 0.04 | 0.07** | 0.02 | 0.09*** | 0.30*** | **0.43**** | 0.13*** | 0.10*** | 0.00 | 0.08*** | −0.00 | **0.14**** | 0.61*** | 1.00 | | |
| 17 Depression (offspring) | −0.01 | 0.08*** | 0.07** | 0.09*** | 0.06** | 0.26*** | 0.15*** | 0.11*** | **0.34**** | **0.32**** | −0.00 | 0.21*** | **0.10**** | **0.58**** | **0.23**** | **0.20**** | 1.00 | |
| 18 Anxiety (offspring) | 0.01 | 0.02 | 0.06** | 0.08** | 0.08*** | 0.28*** | 0.12*** | 0.10*** | **0.31**** | **0.35**** | 0.02 | 0.13*** | **0.16**** | **0.58**** | **0.21**** | **0.20**** | 0.77*** | 1.00 |
| Mean | 0.59 | 41.10 | 0.12 | 0.09 | 6.19 | 18.98 | 8.31 | 10.05 | 1.81 | 1.50 | 0.49 | 15.25 | 5.45 | 19.24 | 8.04 | 10.35 | 1.89 | 1.14 |
| SD | 0.49 | 5.34 | 0.32 | 0.28 | 1.82 | 5.66 | 2.99 | 4.74 | 2.66 | 2.57 | 0.50 | 2.48 | 1.86 | 7.32 | 3.12 | 5.44 | 3.28 | 2.47 |

[a] 0 = male, 1 = female.
[b] 0 = no, 1 = yes.
[c] 0 = no, 1 = yes.
* $p < .05$.
** $p < .01$.
*** $p < .001$.

Residual (SRMR) < 0.05. Statistical analyses were conducted by using SPSS 23.0 and Mplus 7.0.

## 3. Results

During the outbreak of the COVID-19, 11.9% adults reported that they were quarantined in home or hospital, and 8.8% adults reported that they had known that their relatives or friends were quarantined. The worries of infection of COVID-19 were higher in parents than offspring. A majority of parents and offspring endorsed that they worried themselves, relatives/friends, and neighbors being infected of COVID-19, see Table 1.

The prevalence of depression and GAD were 13.7% [95% CI 12.2–15.3%] and 12.5% [95% CI 11.1–14.0%] for parents; while 16.7% [95% CI 15.1–18.4%] and 10.5% [95% CI 9.3–12.0%] for offspring, respectively. The proportions of physical neglect (31.2% [95% CI 29.2–33.3%] for parents and 28.6% [95% CI 26.7–30.6%] for offspring) were relatively higher than emotional neglect (16.9% [95% CI 15.3–18.6%] for parents and 20.8% [95% CI 19.1–22.7%] for offspring).

The means, SD, and relations of studied variables were presented in Table 2. Both parents' depression and anxiety were significantly correlated with offspring's depression and anxiety, and the relationships between parents and their offspring on emotional neglect, physical neglect, difficulties in emotion regulation and COVID-19 related worries were all significant. In addition, parents and offspring with COVID-19 related worries, emotional neglect or physical neglect were also more likely to have difficulty regulating emotions. For both parents and offspring, COVID-19 related worries, difficulties in emotion regulation, physical neglect and emotional neglect were all positively related to their depression and anxiety.

The best fitting model including emotional neglect was shown in Fig. 2, with the following fitting indices: $\chi^2 = 184.56$, $df = 57$, $RMSEA = 0.03$, $CFI = 0.98$, $TLI = 0.97$, $SRMR = 0.03$. Fig. 3 displayed model path analysis containing physical neglect with the best fitting indices: $\chi^2 = 188.52$, $df = 56$, $RMSEA = 0.03$, $CFI = 0.98$, $TLI = 0.97$, $SRMR = 0.03$. The important main paths were shown with colorful solid lines in these two figures. As consistently shown, parents' depression and anxiety levels both positively predicted offspring's depression and anxiety. Parents' COVID-19 related worries, difficulties in emotion regulation, emotional neglect and physical neglect separately had positive effects on offspring's COVID-19 related worries, difficulties in emotion regulation, emotional neglect and physical neglect. Moreover, for both parents and offspring, higher levels of emotional neglect and physical neglect might indicate more difficulties in emotion regulation, and more difficulties in emotion regulation might represent more COVID-19 related worries. Depression and anxiety were positively predicted by COVID-19 related worries, difficulties in emotion regulation, emotional neglect and physical neglect.

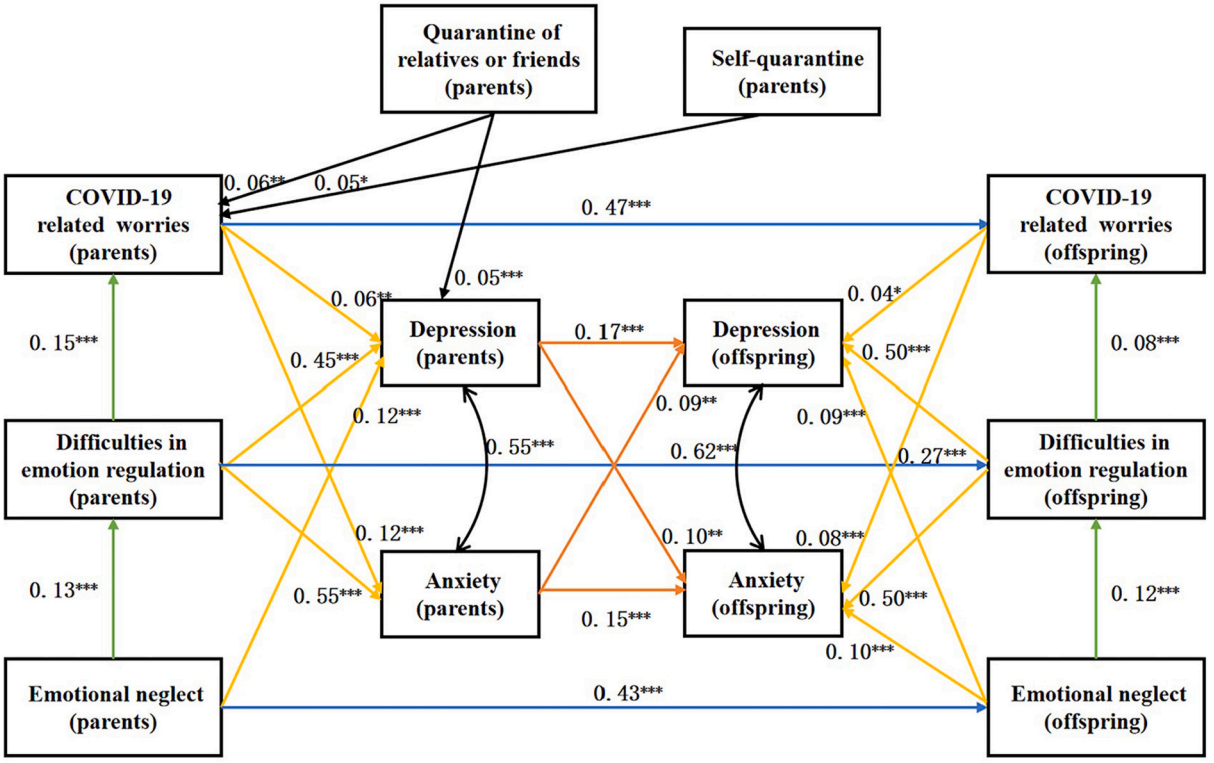


**Fig. 2.** Path analysis containing emotional neglect.

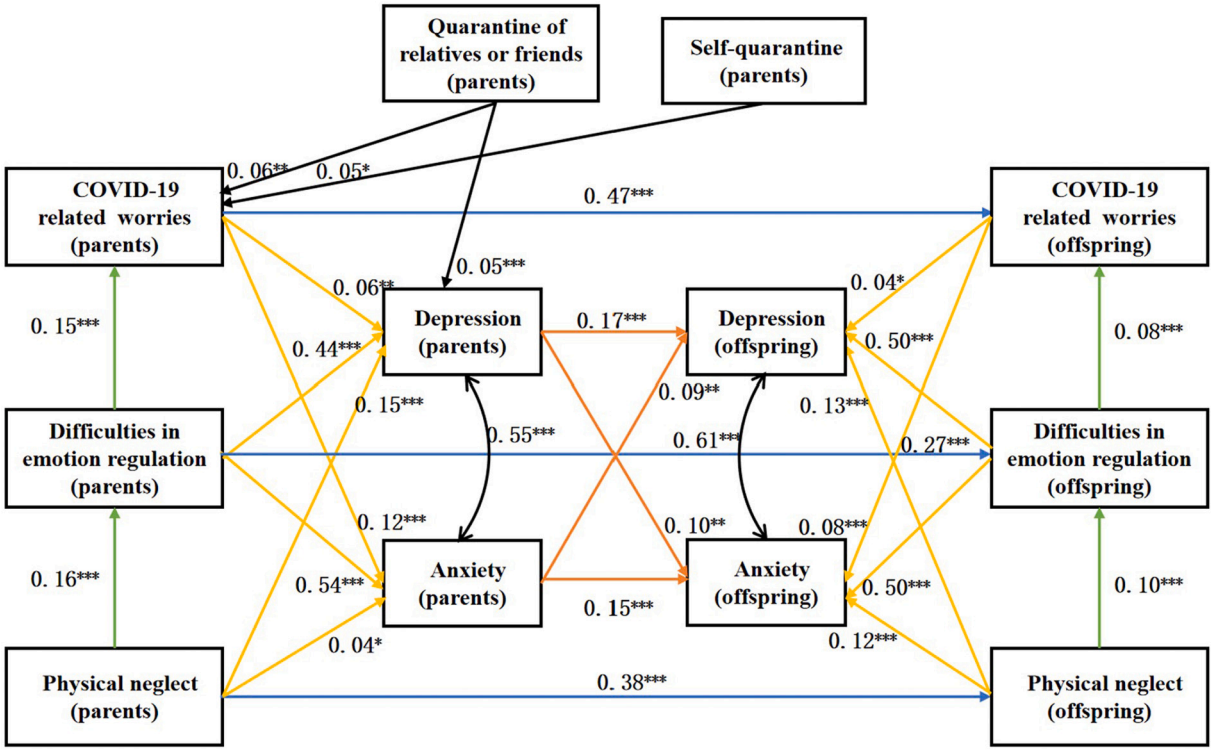


**Fig. 3.** Path analysis containing physical neglect.

## 4. Discussion

This study was the first to investigate the transmission of child neglect, difficulties in emotional regulation, the COVID-19 related worries, depression and anxiety from Chinese parents to their offspring during the COVID-19 pandemic. There were several obvious advantages. First, by selecting a large sample of 2011 pairs of Chinese parents and offspring, the findings were more representative and convincing. Second, parents and offspring completed the same questionnaire and reported their symptoms separately, reducing report bias. Third, the influence of Chinese parents on their offspring during the COVID-19 was clearly demonstrated for the first time: parents' physical neglect and emotional neglect experienced in childhood, difficulties in emotion regulation, COVID-19 related worries, depression and anxiety separately positively predicted their offspring's physical and emotional neglect, difficulties in emotion regulation, COVID-19 related worries, depression and anxiety.

Consistent with our hypothesis, self-quarantine and quarantine of relatives and friends predicted Chinese parents' COVID-19 related worries and mental health problems, but the relationship was not significant among their offspring. Parents obtain information about the pandemic more directly and quickly, so that they are more likely to have psychological reactions to trauma. Offspring can get information through social media and the news, but offspring's psychological reactions are still influenced by the verbal and non-verbal information expressed by their parents, and even the time they spend on social media and electronic devices is affected by their parents' screen time (Zhang et al., 2022). This process can reflect the parent-to-offspring transmission effect in the face of traumatic events.

Our findings showed that parents' depression and anxiety significantly positively predicted their offspring's depression and anxiety, respectively, in the Chinese family system during the COVID-19 pandemic. Previous studies have shown that the environmental mechanisms of transmission of depression and anxiety are mainly daily communication and behavior in the family and parenting style. During the COVID-19 quarantine, parents and offspring spend almost every day together to complete daily family activities. Offspring have limited emotional regulation and cognitive ability, and are more likely to be affected by their parents' views of the pandemic and psychological changes. In addition, depressed and anxious parents have higher levels of stress response to the trauma of the pandemic, resulting in negative parenting styles and problematic parenting behaviors (Prime et al., 2020), which may lead to negative parent-child relationship and further aggravate offspring's mental health problems.

The transmission of difficulties in emotion regulation from Chinese parents to offspring was reported in our study. This transmission can be explained from two perspectives. Firstly, during isolation, parents are the most important reference for offspring. Offspring can learn the appropriateness of emotional expression by observing and imitating their parents (Rutherford et al., 2015), learning negative emotion expression and lacking positive emotion regulation strategies. Secondly, parents' low self-efficacy in emotional regulation will reduce the parenting self-efficacy, and it is difficult to provide positive supportive parenting behaviors for

their offspring, further leading to the offspring's emotional disorders. The mediating role of parenting self-efficacy between parental self-efficacy of regulating emotions and offspring's emotional regulation was also supported by research during the pandemic (Morelli et al., 2020). According to our path analysis chart, there are two ways for parents' emotional regulation difficulties to affect offspring's psychological reactions. Parents' difficulties in emotion regulation can be transmitted to their offspring and then cause their offspring's psychological reactions to trauma. Another is that parents' difficulties in regulating emotions lead to their own psychological reactions, which are then transmitted to their offspring. Therefore, in the face of traumatic events, parents' good emotional regulation skills may be an effective protective factor of offspring's psychological response.

The findings of this study supported that both physical neglect and emotional neglect had moderate intergenerational transmission effects, although the effect size of emotional neglect was slightly larger. Based on Bandura's social learning theory, people who experience neglect in childhood fail to understand the importance of providing attention and support, fail to learn positive parenting style and are likely to raise their offspring with neglect parenting style. Besides, the special pressure environment of prolonged quarantine can make offspring more vulnerable to be neglected. As shown in the path analysis figure, there are three intergenerational transmission pathways in the process of parents' childhood neglect affecting offspring's psychological reactions. First, neglect is transmitted from parents to offspring, further causing offspring's psychological reactions. Second, parents' childhood neglect experiences lead to emotional regulation difficulties, and emotional regulation difficulties are transmitted to offspring to cause psychological reactions. Third, parents who experience neglect produce psychological reactions, which are transmitted to offspring. Therefore, when studying the psychological reactions of offspring in families that have experienced trauma, more attention should be paid to whether parents have a history of childhood neglect and the possible intergenerational transmission mechanism within the family.

Our study suggested that during the COVID-19, childhood neglect significantly positively predicted difficulties in emotional regulation, and difficulties in emotional regulation could lead to more COVID-19 related worries, depression and anxiety, for both Chinese parents and offspring. The negative effects of neglect on the development of emotion regulation have been supported by previous studies (Alink et al., 2009; Kim & Cicchetti, 2010), and one possible reason is that neglect interferes with the acquisition of emotion understanding and emotion regulation skills (Shipman et al., 2005). When people have difficulty in regulating their emotions, they are more likely to be dominated by emotions and find it difficult to make objective and reasonable cognitive judgments on negative information, thus aggravating their COVID-19 related worries. What's worse, difficulties in emotional regulation make it difficult for people to cope with negative emotions from the trauma of the pandemic, with the cumulative effects of the trauma, further leading to mental health problems such as depression and anxiety.

### *4.1. Implications*

Our findings identified a significant intergeneration transmission effect of neglect, difficulties in emotion regulation, depression and anxiety from parents to offspring when face to public health events. The findings suggest that family members share a certain degree of similarity in psychological reactions to trauma, and transmitted susceptible factors from parents to offspring may contribute to this similarity. Besides, we find a cumulative effect of trauma in families, which suggest that the family's response to traumatic events is related to the personal development history, especially the parents' experiences of childhood trauma. Therefore, family therapy may be suitable for family members exposed to the same traumatic events, and more attention should be paid to parents with childhood trauma when developing targeted psychological interventions. In addition, the intergenerational transmission of different types of trauma, such as war (Davidson & Mellor, 2001; Dekel & Goldblatt, 2008) and the Holocaust (Yehuda et al., 2001), has been supported by previous research. This study expands the research field of intergenerational transmission of trauma by using the COVID-19 as a form of trauma. Our findings also suggest that emotional neglect has a larger transmission effect than physical neglect, which makes the effects of different types of childhood trauma clearer.

### *4.2. Limitation*

There were several limitations to interpreting our findings. First, causal inferences could not be drawn because cross-sectional data were used. Second, the parent - offspring dyadic data may violate the assumption non-independence, although parents and students completed their questionnaires separately interval two weeks. Thus, the transmission effects of psychological distresses, childhood neglect, and difficulties in emotion regulation might be overestimated. Third, the data were collected during the COVID-19 outbreak in February 2020, so the long-term impact of the outbreak needed to be further studied. Finally, the parents and offspring in the sample were mainly from ordinary families, with no data on the presence of confirmed patients or healthcare practitioners in the family. Future longitudinal studies should focus on the intergenerational transmission effects of neglect, difficulties in emotion regulation, depression and anxiety, and the cumulative effects of trauma in the family system after long-term quarantine.

## Data availability statement

The data that support the findings of this study are available on request from the corresponding author, Fulei Geng.

## Declaration of competing interest

No.

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